Aerial Targets
& Unmanned Aviation

A Perspective on Needs, Initiatives and Vision

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Deputy Program Executive Officer
Strike Weapons and Unmanned Aviation
1 November 2005

NAVAIR

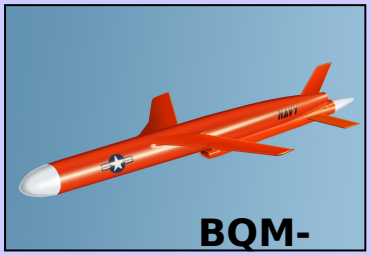
Aerial Targets

A major segment of Unmanned Aviation

Navy Subsonic

BQM-34S

BQM-74E



BQM-74F

Navy Supersonic

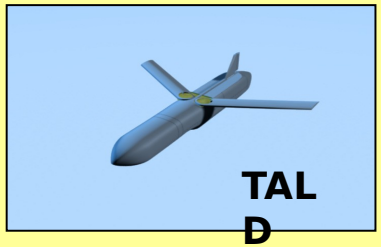
GQM-163A

AQM-37

MA-31

THREAT D

Decoys



TAL D

ITALD

Air Force/ Army

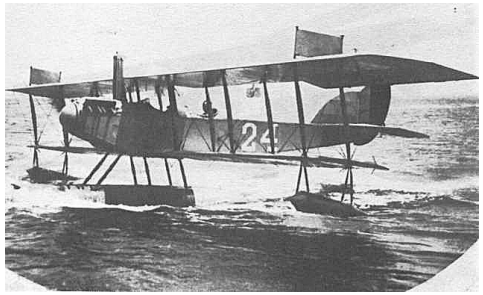
MQM-107

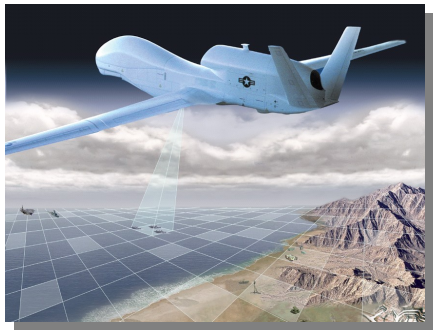
QF-4

BQM-167

Unmanned Aviation
Evolving, Expanding . . . Essential

Past





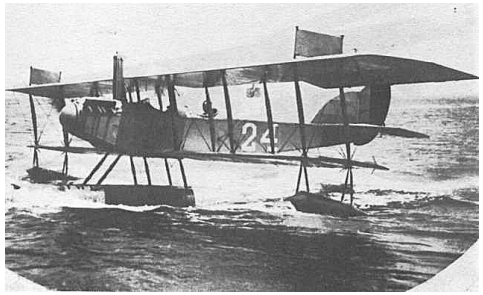
Present

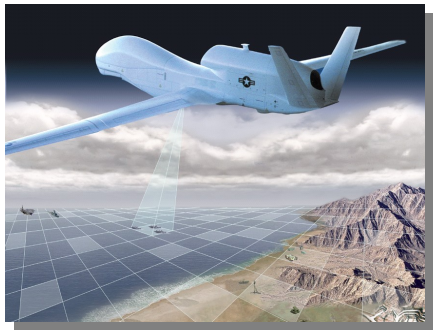
Future

NAVAIR

Unmanned Aviation
Evolving, Expanding . . . Essential

Past





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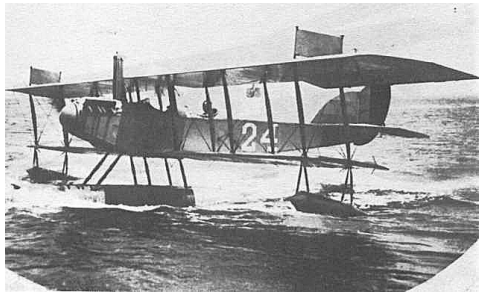

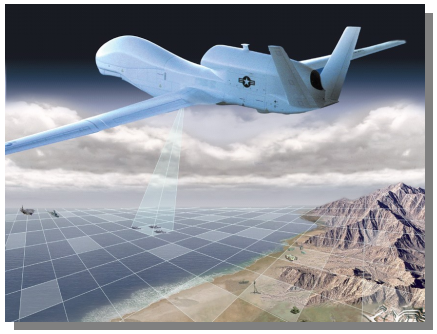

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Unmanned Aviation

Evolving, Expanding . . . Essential

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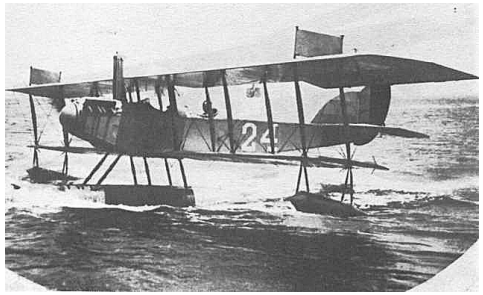

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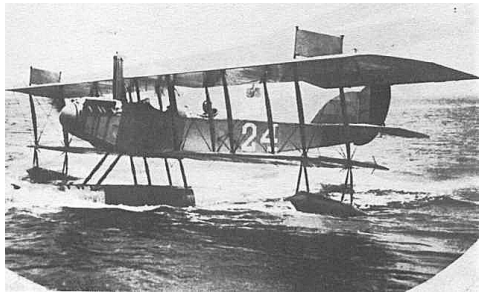

Present

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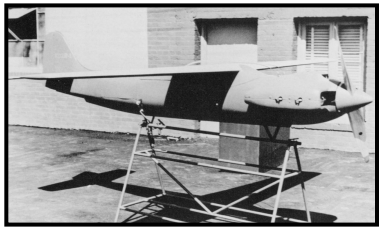
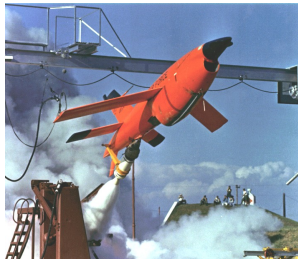
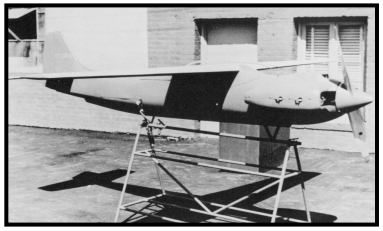
Aerial Targets
Evolving, Expanding . . . Essential

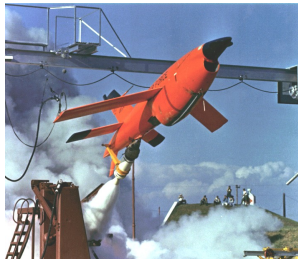




Generic Targets

Aerial Targets
Evolving, Expanding . . . Essential





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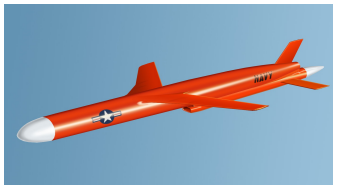
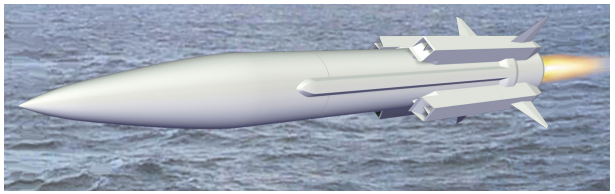
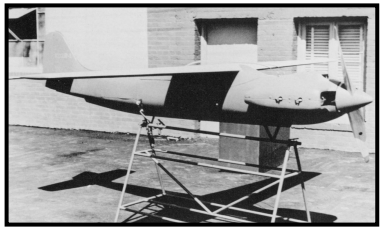
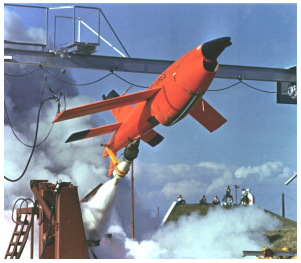




Representative Profiles

Aerial Targets
Evolving, Expanding . . . Essential

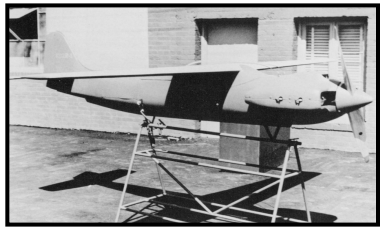


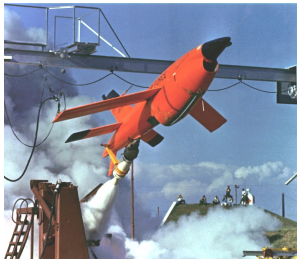


Generic Targets

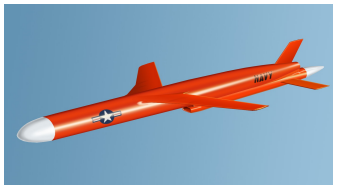
Representative Profiles

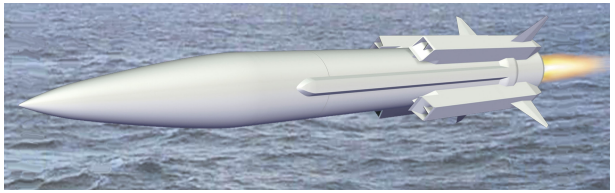
Aerial Targets
Evolving, Expanding . . . Essential



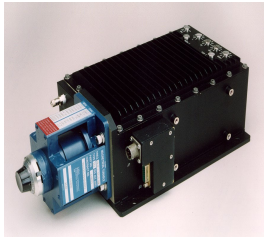


Generic Targets



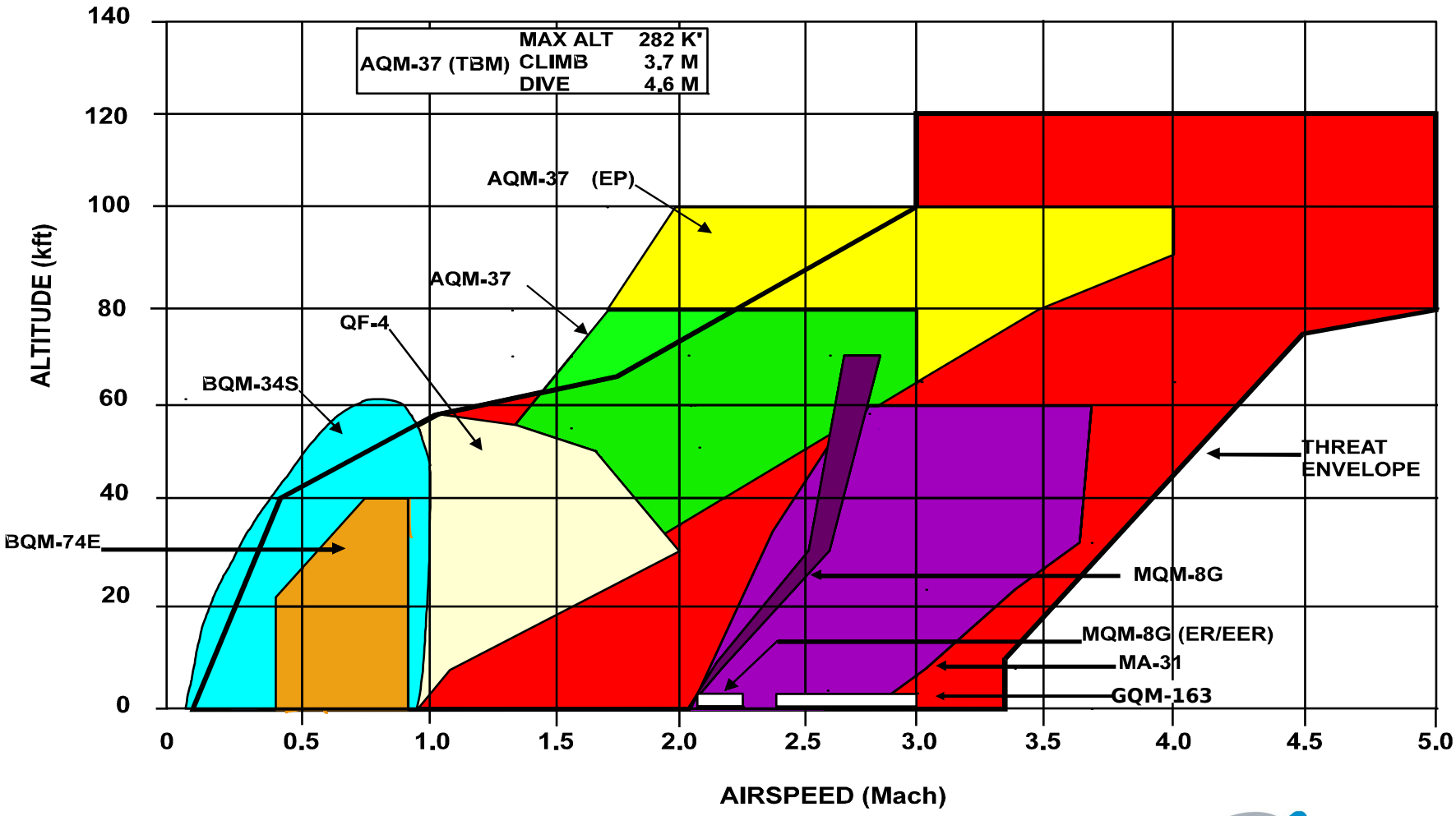


Representative Profiles



Diverse Payloads

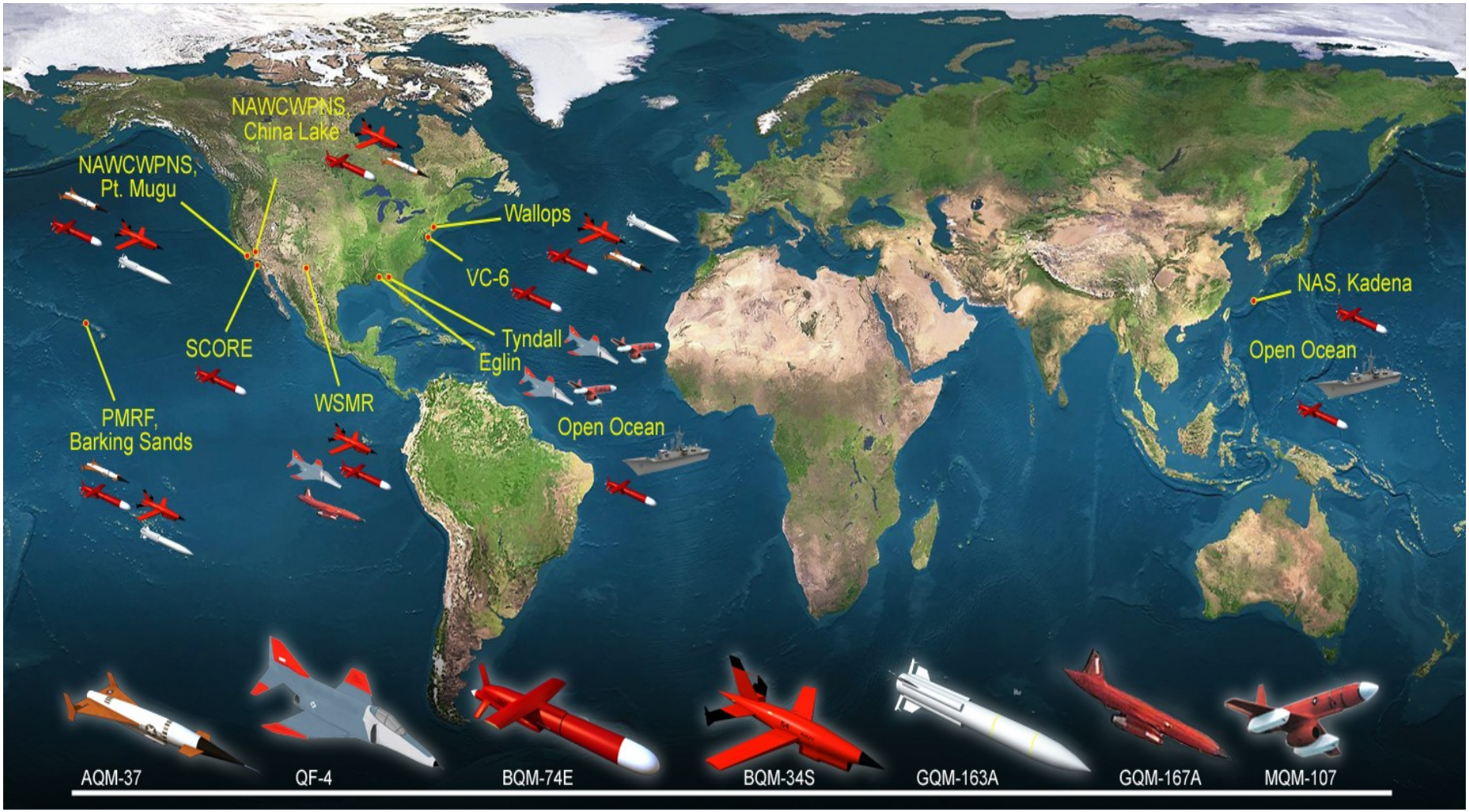
Aerial Targets
A broad spectrum of performance



Aerial Targets
State-of-the-art capabilities

Future Targets
Unique Challenges

Aerial Targets
A world-wide Operation



Aerial Targets
More than an air vehicle

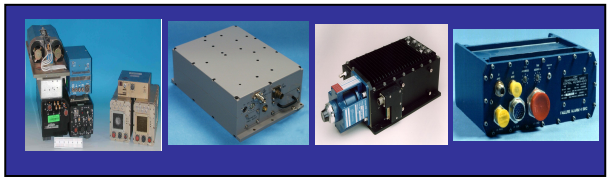
Targets

Range Interface Standards

Payload Interface Standards

Ranges

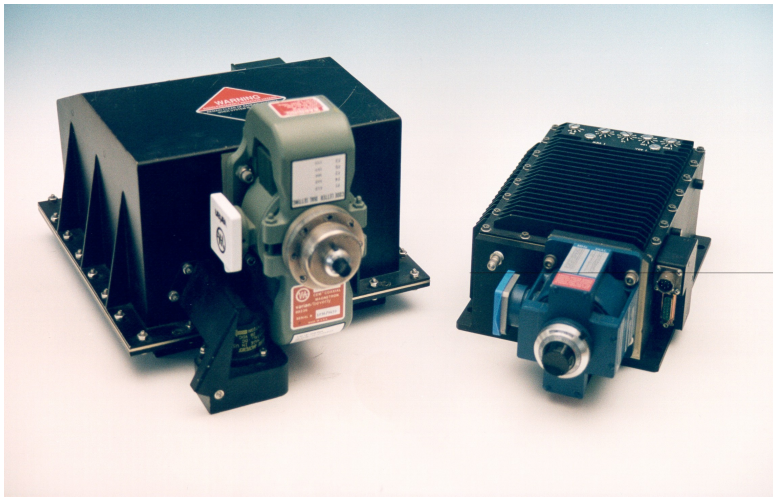
Control & Data Standards

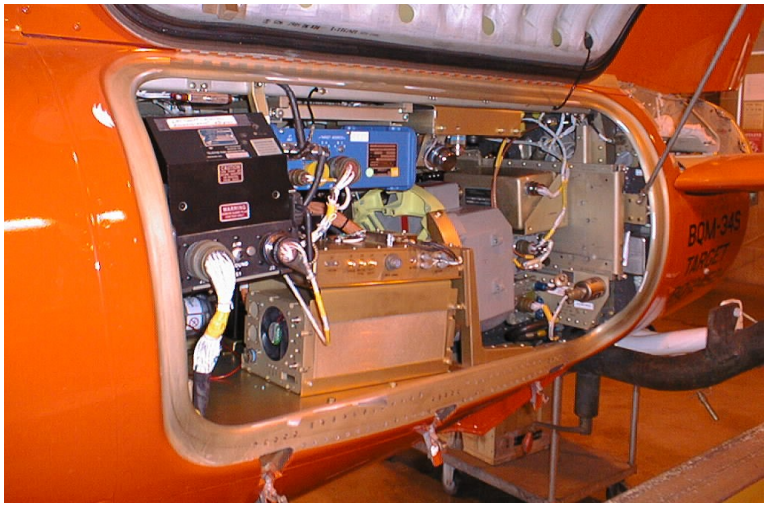


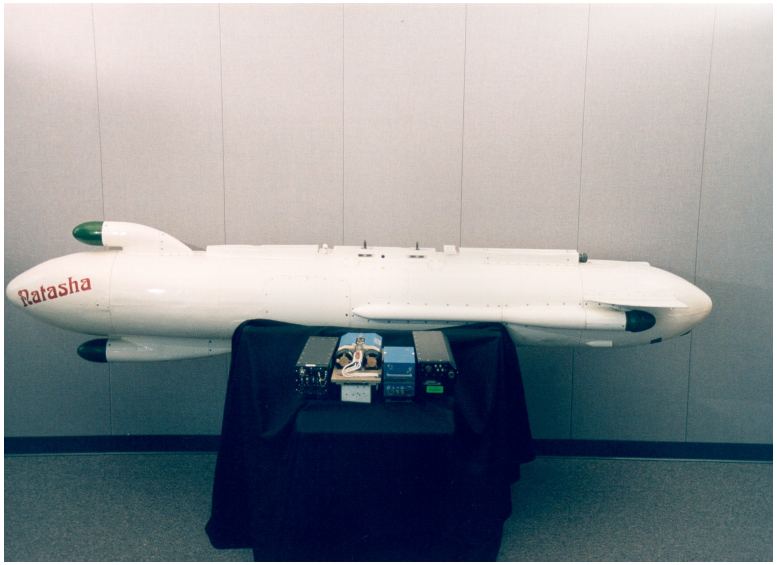
Target Payloads

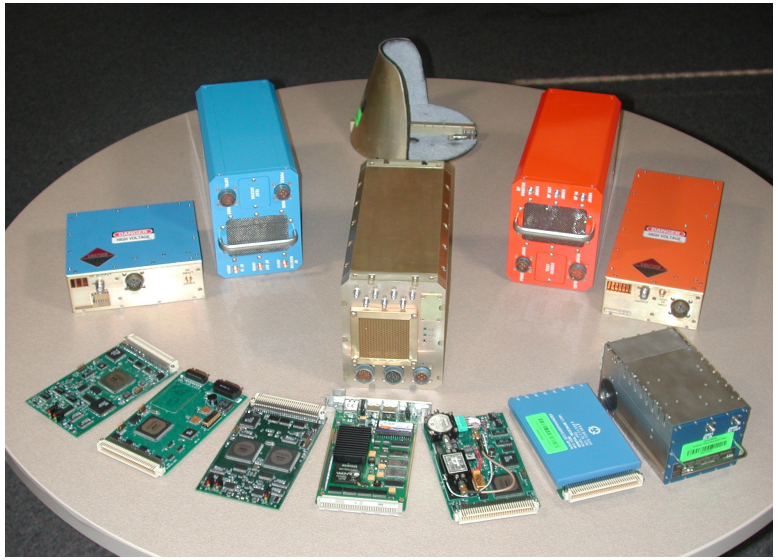
Control Systems

Target Payloads
A growing system element



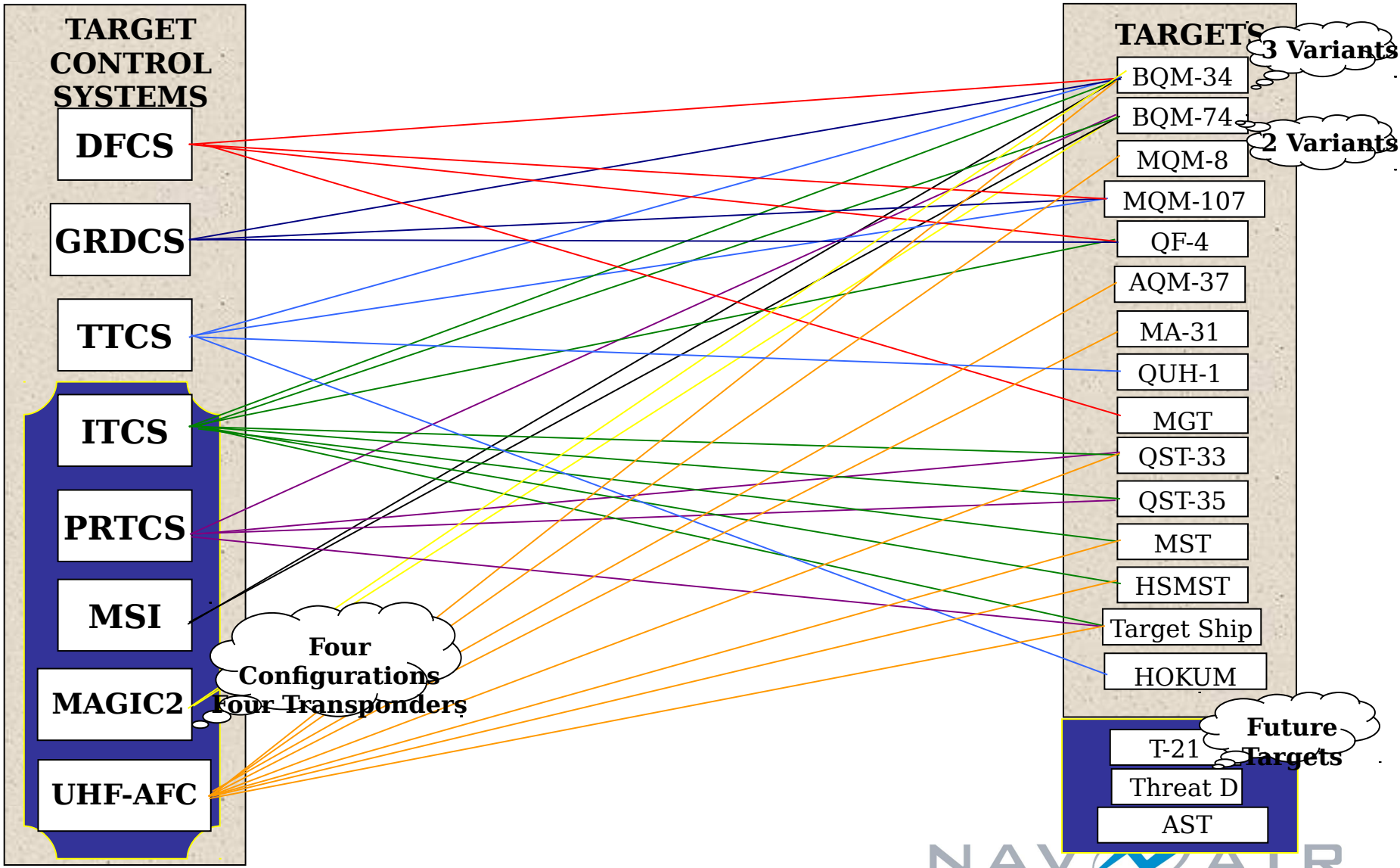






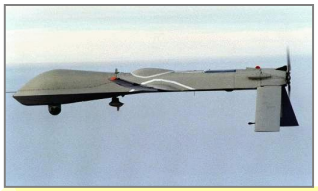
Target Control Systems

Today's Reality



UAV Open Architectures and Standards

The Key to Mission Flexibility



Vehicles

Weapon Interface Standards

Payload Interface Standards

Weapons

Control & Data Standards

Data Link

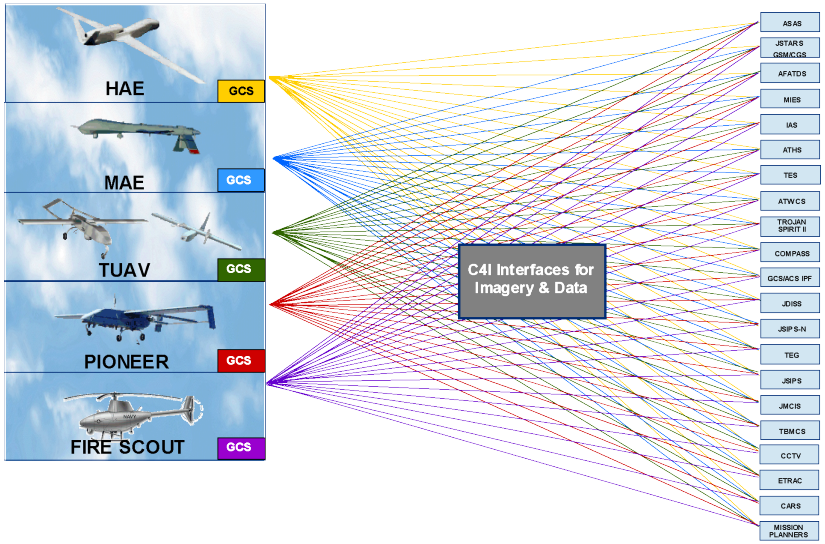
Payloads

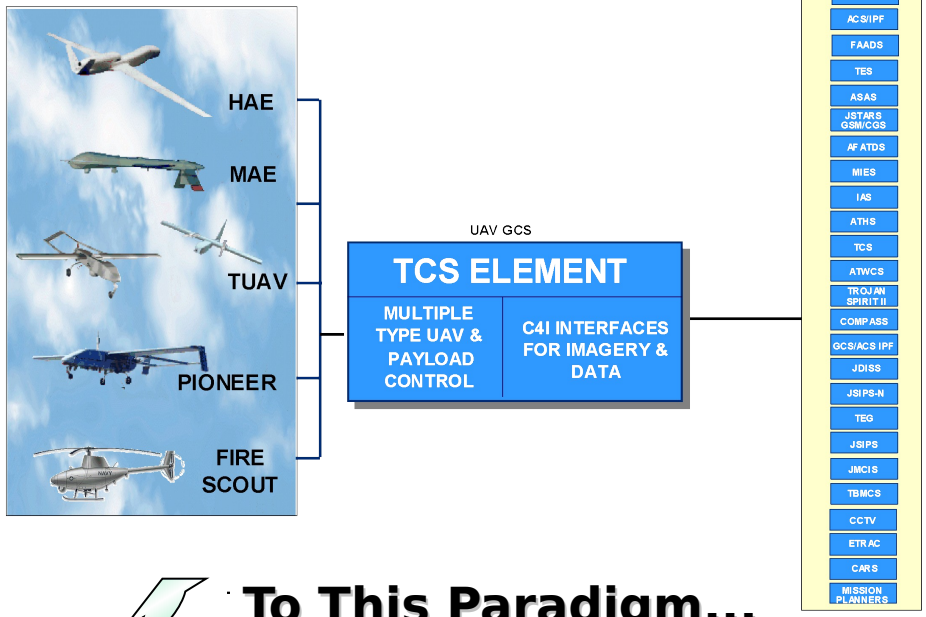
Control Systems

Data Distribution Interfaces

UAV Tactical Control System Vision

From This Paradigm...





To This Paradigm...

TCS levels of control:

LEVEL I
- Indirect Product

LEVEL II
- Direct Data Receipt

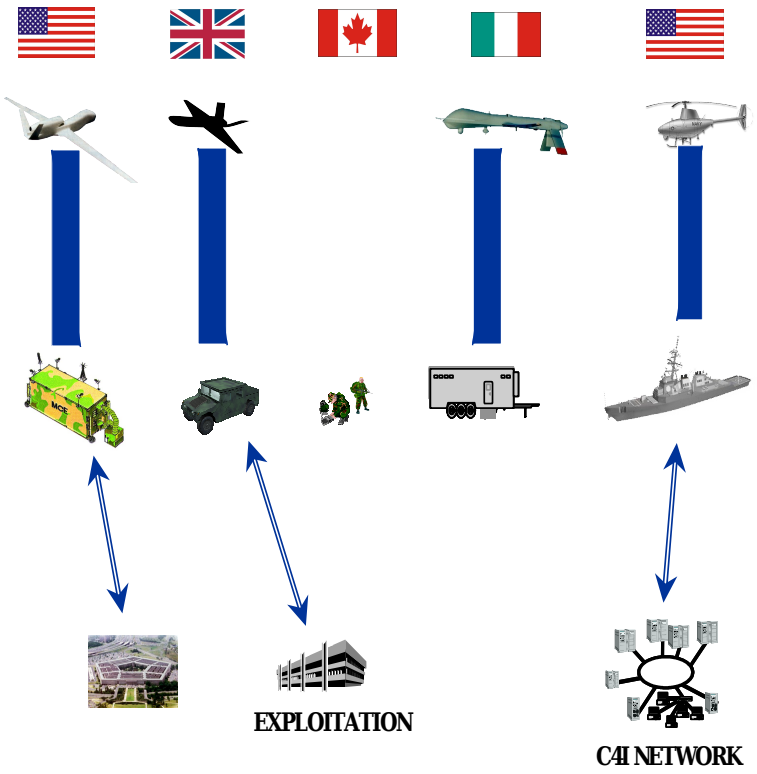
LEVEL III
- Payload Control
- Direct Data Receipt

LEVEL IV
- Flight Control
- Payload Control
- Direct Data Receipt

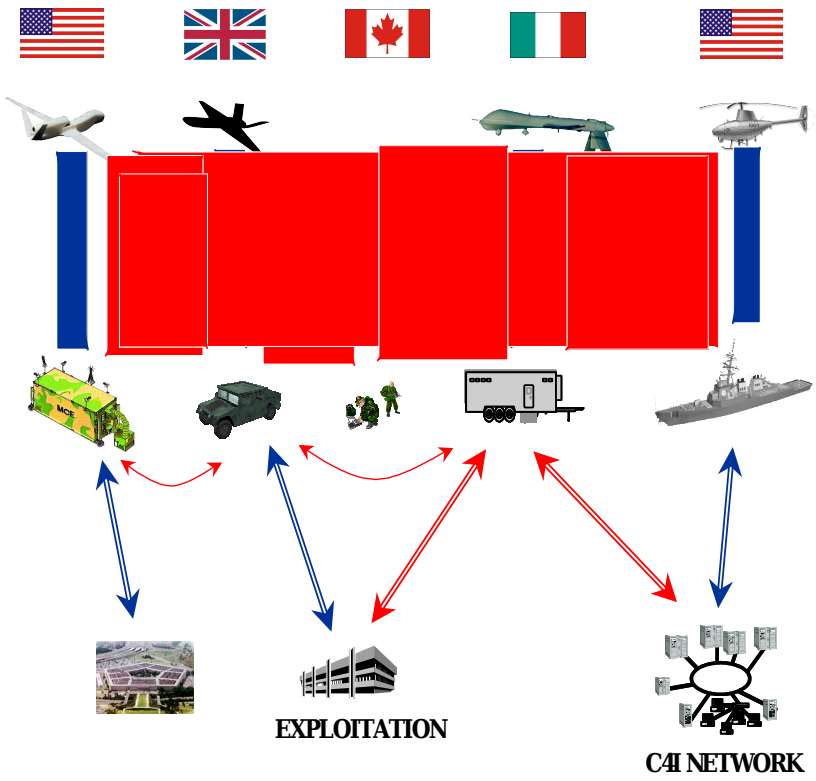
LEVEL V
- Launch & Recovery
- Flight Control
- Payload Control
- Direct Data Receipt

NATO Vision of Interoperability

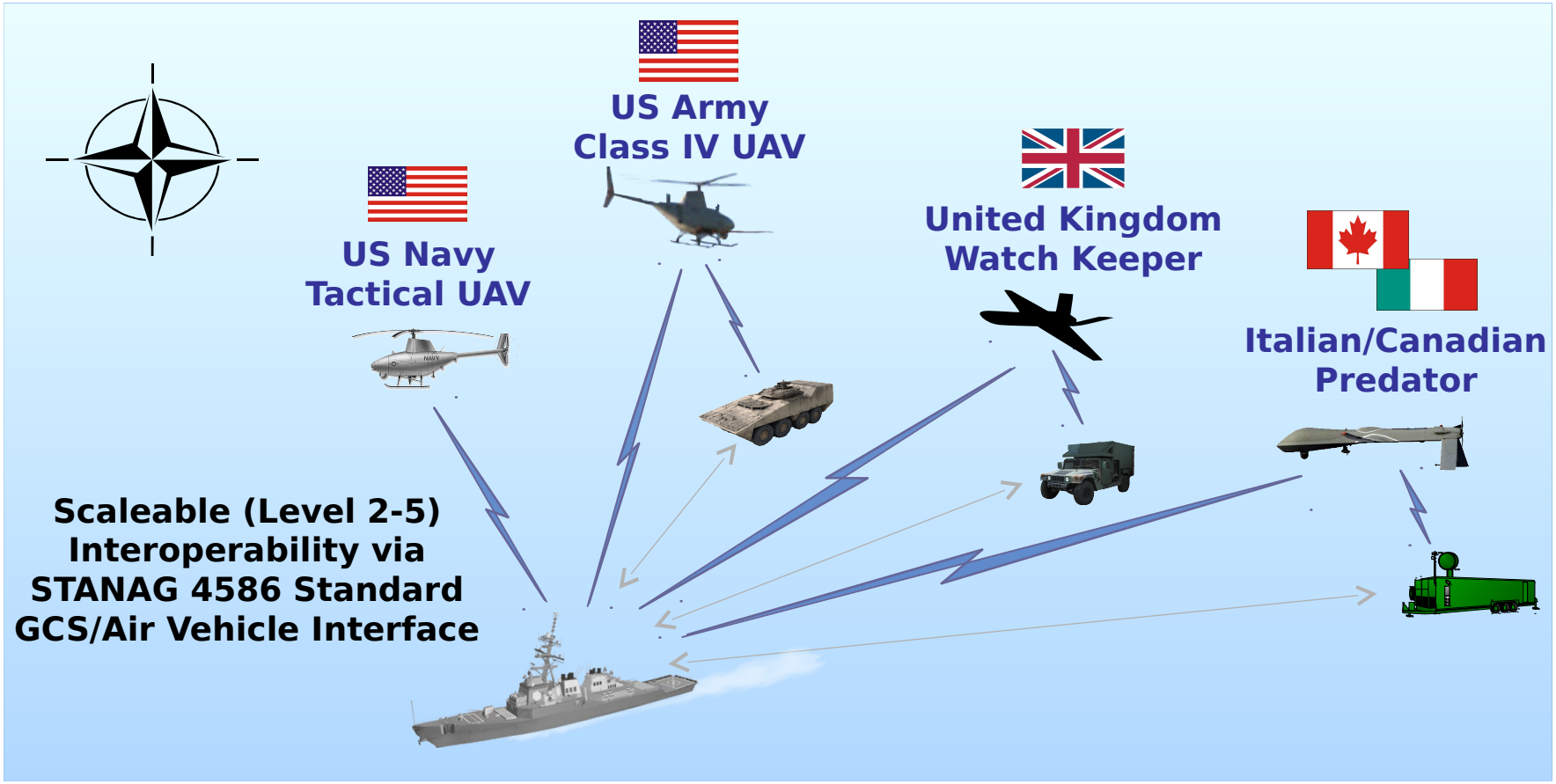
From this . . .



. . . To this



NATO STANAG 4586



JOINT-SERVICE/NATO-COALITION INTEROPERABILITY

TCS Architecture (STANAG 4586)

Level I	Level II	Level III	Level IV	Level V
• Secondary Product	• Direct Data Receipt*	• Payload Control	• Flight Control	• Launch & Recovery

E =" Exchange With" T = "Transmit To"

1. Tactical Messages
2. Email Messages
3. NITF Files
4 Digital Video
5. Analog Video
6. Internet relay chat
7. Voice over IP
8. Mission Plans
9. GMTI Data
10. SIGINT Data
11, ATS Messages
12. Handover Msgs

* Through TCS Data Link Control Module

Future Naval Air Vehicles

TCS

Standards Based Interoperability

Vehicle & Payload Control

C4I Interfaces Specific Modules

Data Link Interface *STANAG Defined*

Command & Control Interface *STANAG Defined*

Human Computer Interface *STANAG Guidance*

Future C4I Systems

C4I System (AFATDS) E1

C4I System (ASAS) E1, E2, T3

C4I System (CCTV) E5

C4I System (JSTARS CGS) E1, E2, T3, T5

C4I System (JSIPS-N) T3

C4I System (JDISS) E2, T3, E6, E7

C4I System (GCCS-M) E2, T3, T4, T5

C4I System NATO STANAG {E AdatP-3 Messages} E2, E3, E4, E7, E8, E9, E10, E11, E12

Simultaneous Control of Two Fire Scouts

TCDL

ARC-210

Payload Control of Either Fire Scout

AVO:

2 Vehicle Control

MPO: Payload Control of Either Vehicle*

Joint Target Control System Goal

TARGETS

- AQM-37
- BQM-34
- BQM-74
- MQM-8
- MQM-107
- QF-4
- QF-106
- QUH-1
- MGT
- QST-33
- QST-35
- MST
- HSMST
- QH-50
- MA-31
- Target Ship
- QLT-1
- HOKUM

Provide an interoperable and scaleable command, control, communications, and data dissemination system for the family of targets and future targets

Multiple type targets, payloads & datalinks

Interface for data & payload dissemination

USERS

- **Test & Evaluation Data Collection Systems**
- **Air Traffic Control**
- **Range Control**

Navy / J-UCAS

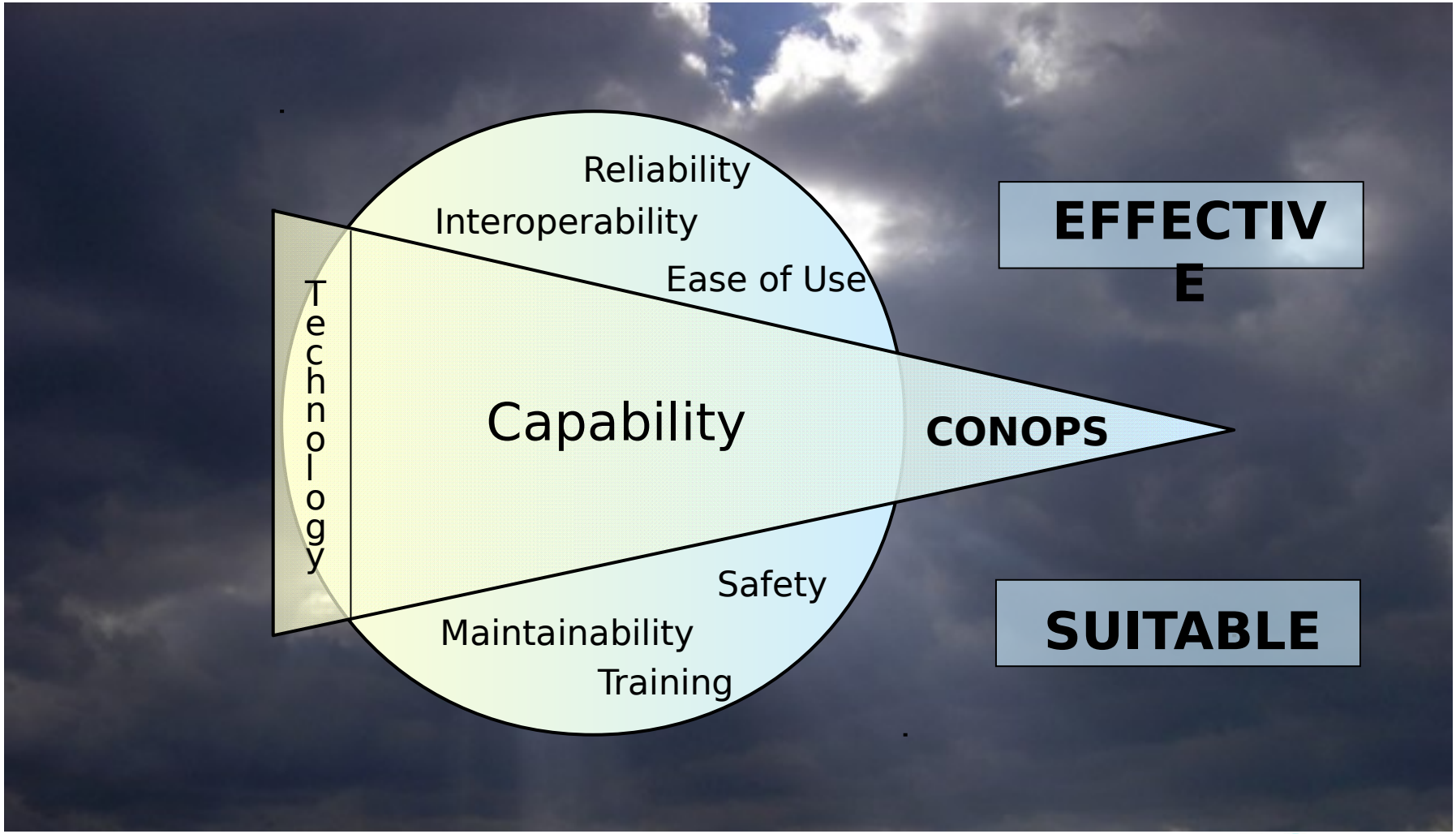
- **Complement manned assets**
- **Primary mission of Persistent Intelligence, Surveillance, and Reconnaissance (P-ISR)**
- **Multi-mission capable**
  - **Limited CV space**
  - **Spiral approach to full capability**
    P-ISR IOC 2015 / SEAD/Strike IOC 2020
- **Expand capability of the CVW**
  - **Continuous CVN operations**
  - **Persistent surveillance / strike**
    - **Time critical targets**
    - **Time sensitive operations**
- **Sensors**
  - **SAR/GMTI**
  - **EO/IR**
  - **ESM**

A future target variant?

Target Systems
Future Trends

- Increased use and complexity of preplanned missions
- Greater emphasis on T&E
- Multiple Target applications
- Expanded payloads
- New target types
- More widespread operations

Capability Counts
but users need the whole package



Some Target System Challenges

Threat Based

- Supersonic dive
- Subsonic / Supersonic
- More extensive and accurate representation
  - IR
  - RCS
  - Countermeasures

Operations driven

- Architecture and standards
  - Control
  - Payload
- Soft kill testing
- Reconfiguration, reuse, and versatility
- Inventory management
- Cost Control

Target Systems

The need is great…

…the future is bright

…the horizons are endless